organic motion

Organic Motion Stage™ Plugin For Autodesk® Motionbuilder®

User's Guide

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1 Introduction And Definition Of Terms

The Stage™ Plugin for Autodesk® Motionbuilder® provides a natural interface to Organic Motion's Stage system. With it you can pull data straight from any Stage system straight into Motionbuilder for production or real-time use. This document describes how to best use the Plugin to control Stage, bring your motion capture data into Motionbuilder, and use that data in different scenarios.

The following are terms used frequently in this manual:

Characterization: Motionbuilder's process of setting up a skeleton to allow its motion to be retargeted. For retargeting to occur between two or more models, all of these models must be characterized.

Device: A category of plugins in Motionbuilder that connect to external hardware or software. The Stage Plugin is an 'input' device, because it receives data from the Stage system.

Model Binding: The generic Motionbuilder term for a set of scene elements to which animation data can flow. In the case of the Stage Plugin, these scene elements take the form of a skeleton.

Retargeting: The process of mapping motion from one arbitrary skeleton to another arbitrary skeleton. This allows Motionbuilder to transfer motion from the Stage's skeletal representation to that of your own model.

Server: Another way of referring to the Stage system.

2 Installation

To install the Plugin, double-click on the appropriate installer for your version of Motionbuilder, and follow the instructions given by the installation wizard.

3 Stage™ Plugin Layout

There are two main areas in the Plugin pane. The first is the general device control section consisting of the Online, Live and Recording buttons, the Model Binding drop-down box, and the Device Information box. The second is the tabbed region, which consists of three tab panes: Control, User Calibration and Bones.
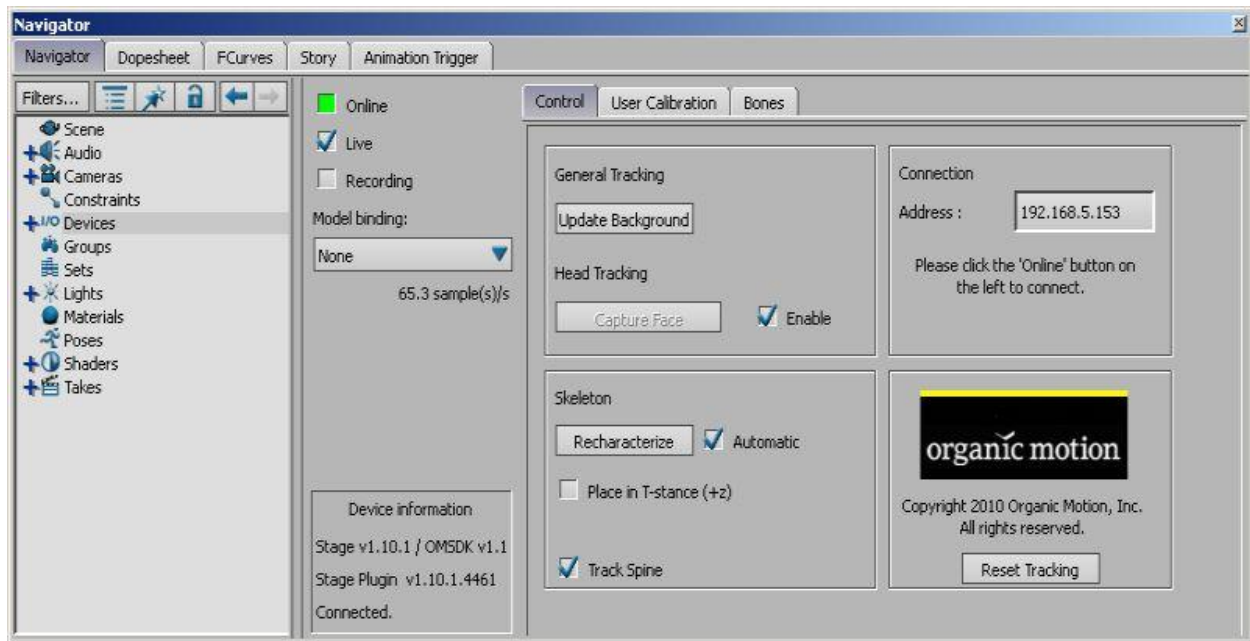
Figure 1: OM Device Main Layout

3.1 General Device Controls

The following are elements of the General Device Control section.

Online: Clicking this button initiates a connection to your Stage system.

Live: When Live mode is on, all elements in the scene associated with the Plugin are driven using data from the Stage. When Live mode is turned off, these elements are driven from keyframe data. Turn Live mode off when you wish to review recorded motions.

Recording: This button must be enabled while recording in order for Plugin data to be saved to keyframes.

Model Binding: Ensure that you have first gone Online at least once before creating a Model Binding. Selecting Create on the Model Binding drop-down to place a Plugin data-enabled skeleton, usually labeled "OMT Skeleton," into the scene.

You can create multiple model bindings, each of which will record to its own set of keyframes. If one or more already exist, you can select an existing one to redirect the Plugin data to that model binding.

Sample Rate: The value in sample(s)/s just below the Model Binding drop-down box represents the sample rate of the device. When the Plugin is online, the sample rate should approximate the frame rate of the Stage™ system to which it is connected.

Device Information: This box contains three lines of information.
1. Stage system version / OMSDK client dll version. If these versions do not match, unexpected behavior may occur

2. Stage Plugin version
3. Connection Status

Connection-dependent information is left blank until a connection is made.

3.2 Control Tab

The control tab contains several controls that allow you to interact with your Stage system.

3.2.1 General Tracking & Head Tracking

This group box contains Stage-specific controls, including buttons for updating the background, initiating a lighting calibration, and using the head tracking feature. Please refer to the Stage user manual for details about how and when to use these controls.

3.2.2 Connection

Address: Specifies the IP address of the target Stage system.

3.2.3 Skeleton

Retargeting: This is the process of mapping the motions of one skeleton to another skeleton in a visually 'correct' fashion.

Recharacterize: This button allows the user to manually characterize when the OM skeleton changes (which happens every time a new user enters the space). This button is only needed if you have not checked 'Automatic'-*See Below.*

Automatic: With 'Automatic' turned on, each new user's skeleton will be recharacterized when they are acquired in Stage, allowing for optimal retargeting. It is *highly* recommended that you leave 'Automatic' enabled.

Place In T-stance (+z): Places the model binding in a +z-facing T-stance. Use this control when you need to re-characterize the OMT skeleton (see section 4.1)

Track Spine: Enabling spine tracking allows Stage to more accurately model the curvature of the bones in the user's torso.

3.2.4 Other

Reset Tracking: Places Stage™ in its initial startup state with the skeleton in a T-stance.

3.3 User Calibration Tab

Most of the controls on the user calibration tab are duplicated from the Stage Administration program for convenience. Please refer to the Stage User Manual for details on these controls.

The following are controls specific to the Stage Plugin for Motionbuilder:

Status: Indicates the status of the user calibration.

Floor Offset: After performing a user calibration, the Stage Plugin will calculate an offset to properly place the feet of the model on the ground plane. If the calculated value does not meet your needs, you can adjust it manually.
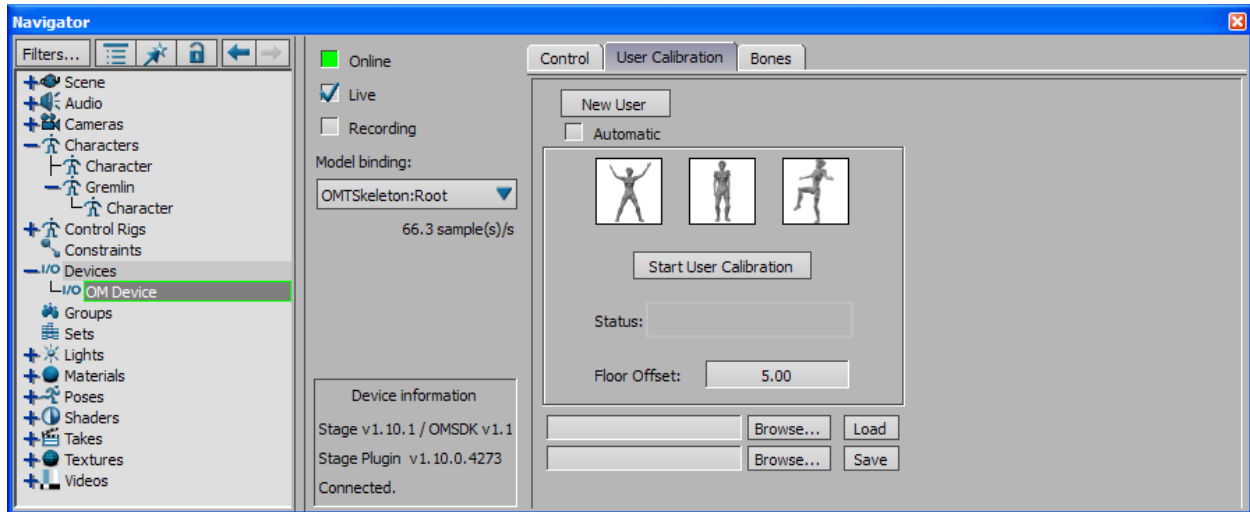

Figure 2: User Calibration Tab

3.4 Bones Tab

The bones tab is primarily for informational purposes. For each bone, it displays the relative position, as well as the Euler angles of rotation.
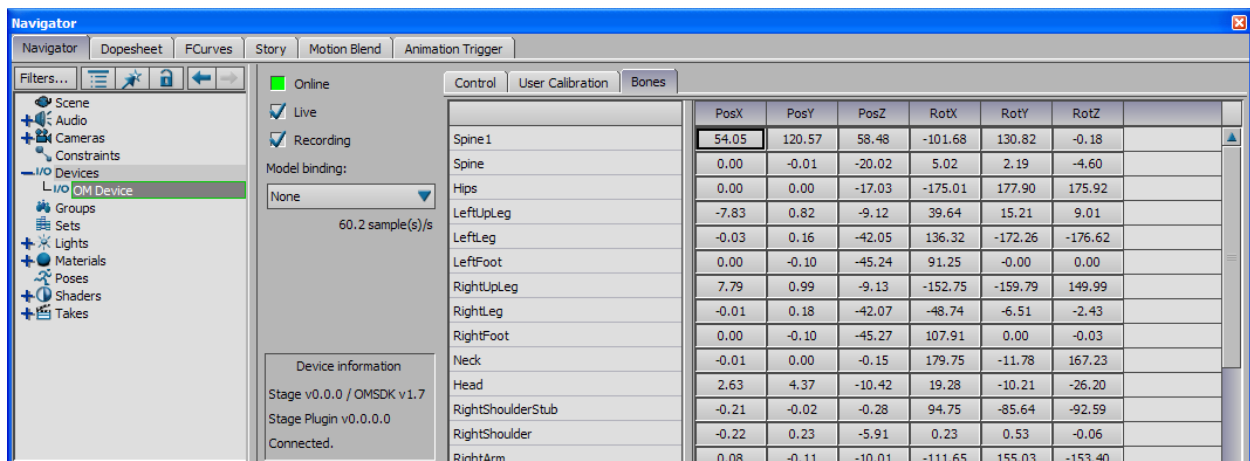

Figure 3: Bones Tab

4   Stage™ Plugin Usage

4.1   Setting Up A Stage™ Plugin-Enabled Scene

The following steps explain how to enable your scene to receive animation data from a Stage system.

1. Launch Motionbuilder.
2. In the Asset Brower window, click on the Asset Browser tab, and navigate to the Templates→Devices leaf. Find the icon for OM Device, and drag this into the Viewer window.
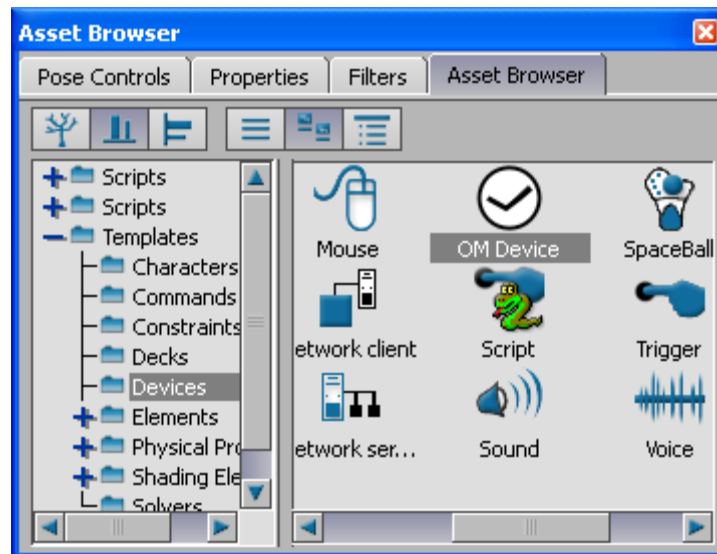

Figure 4: Asset Browser

3. Launch an Organic Motion Stage™ system. Connect Motionbuilder to the system by entering the proper IP address in the Address field and clicking the Online button. Make sure the 'Live' checkbox is checked.
4. At this point, the model binding has not yet been created. To create it, click on the Model Binding drop-down and select the 'Create…' option. You should now see a skeleton form in the viewer window. You may create as many model bindings as you wish. Whichever is selected in the selection box is the one that will receive the data from the Organic Motion server.

    NOTE: You must connect to an Organic Motion data server at least once prior to creating your model binding, otherwise your model binding will be empty. If you did not do so, you can always create another one after connecting. To delete an empty model binding, locate it in the Scene branch in the Navigator, right click it, and choose 'delete.'

5. We now need to characterize our model binding. In order to characterize a biped in Motionbuilder, the biped must be facing down the +z axis. To bring the model binding into this state, click the 'Place in T-stance (+z)' checkbox. *Note: Make sure 'Automatic' is checked. This will ensure that animation is optimized for any user entering the system after this point.*
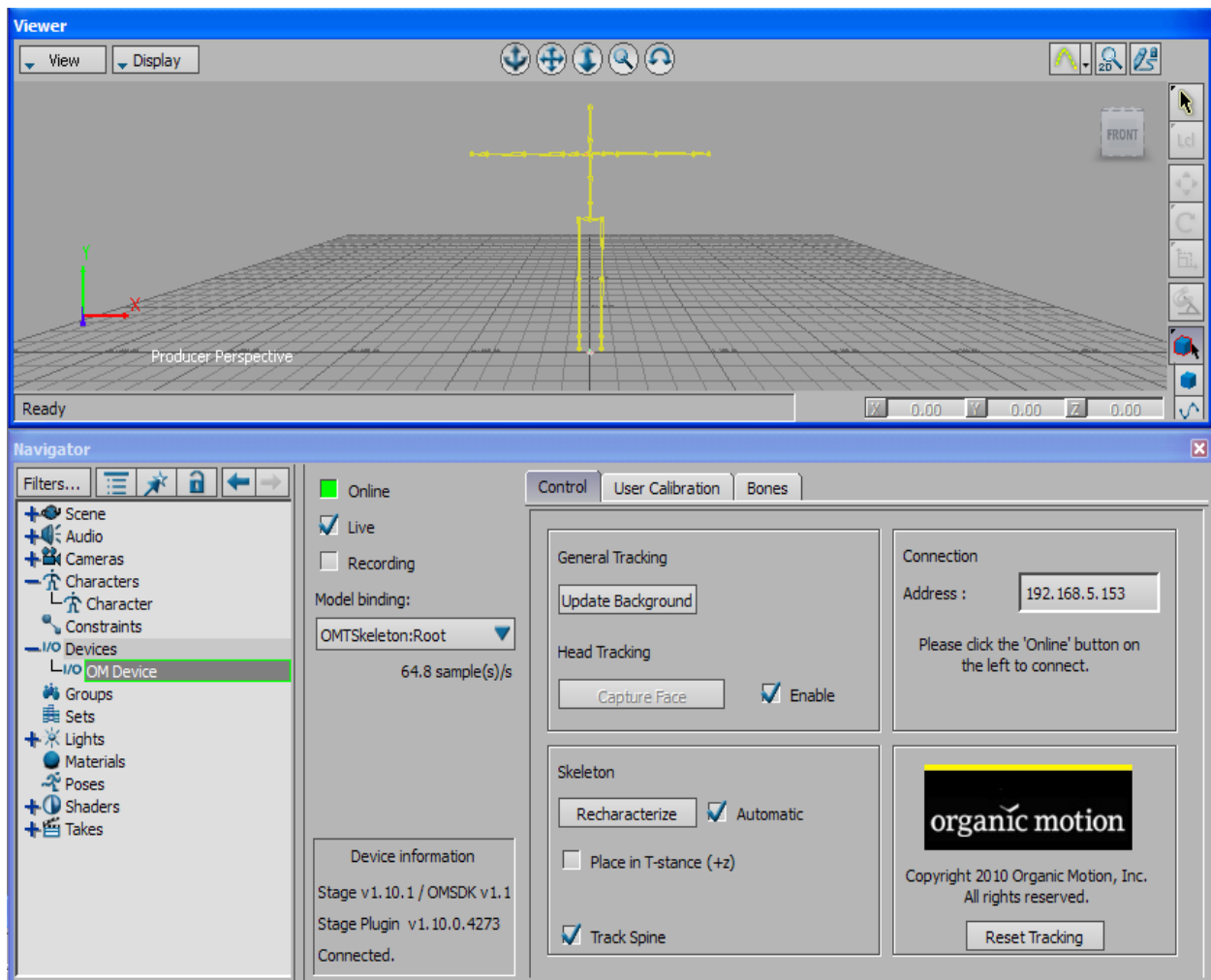
Figure 5: Model Binding in T-stance

6. In the Asset Browser window, bring up the Asset Browser tab, and navigate to the Templates→Characters leaf. Find the icon for 'Character,' and drag it on top of any bone on the body of the skeleton. Select 'characterize' from the pop-up context menu.

7. A hierarchy warning will appear. Click Ok All.

8. A note about the +z requirement will appear. Click Biped. The skeleton is now characterized.

9. You may wish to rename the character node that has been added for your character, to avoid potential naming conflicts. To do so, navigate to the 'Characters' tree in the Navigator pane, and find the node that was just created (usually 'Character'). Right click this node, enter the new name (e.g., OMCharacter) and hit enter.

10. Uncheck the 'Place in T-stance (+z) checkbox. The scene is now ready.

If you forgot to click the 'Place in T-stance (+z)' button before characterizing, you do not need to start the scene over again. Simply follow these steps:

1. Go to OM Device→Control tab→Skeleton box.

2. Click the 'Recharacterize' button.

Your model may be facing away from you at this point. You can use the Viewcube, shown in figure highlighted in the red box, to rotate the Viewer to have the model face forward.
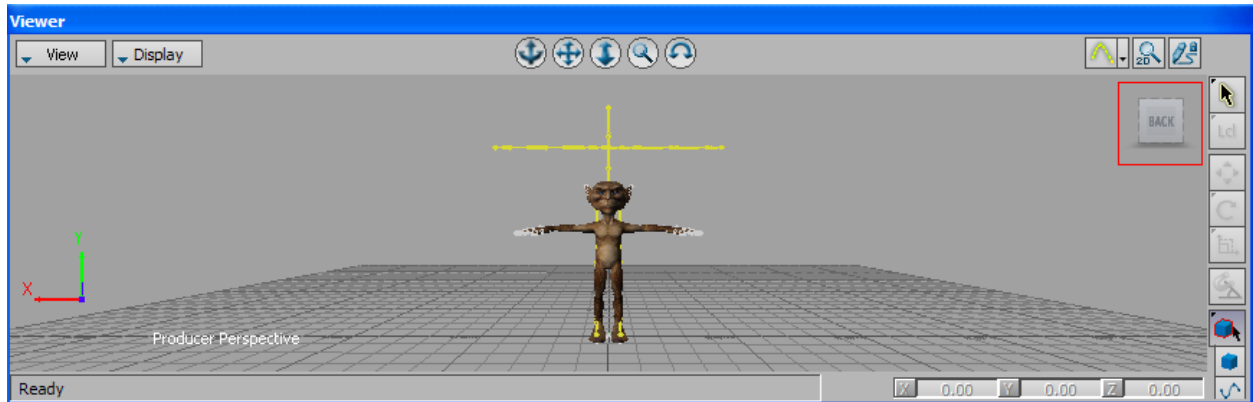

Figure 6: Viewcube

## 4.2 Driving your own model with the Organic Motion skeleton

With the scene now enabled for Stage animation data input, you can now import your own 3d model to be driven by this animation data.

1. To drive your own model with the Motionbuilder skeleton, your model must be characterized. If the skeleton associated with your model follows Motionbuilder naming conventions, you can follow the procedure explained in section 5.1, steps '6' through '10.' If your model's skeleton does not follow Motionbuilder naming conventions, the process is slightly more manual. Please consult the Motionbuilder documentation for information on how to characterize your model.
2. Merge your characterized model into the scene. You can do so from the Asset Browser, or using the File→Merge command.
3. In the navigator window, navigate to the leaf under 'Characters' that represents your character. Double-click it to bring up the character menu.
4. Under the 'Character Settings' tab, select 'Character Input' from the 'Input Type' selection box.
5. Make sure the 'Active' checkbox is checked.
6. Select the Organic Motion character from the 'Input Source' selection box. You should now see your model being driven by the Organic Motion skeleton.

4.3 Recording And Playing Back Motion Data

With your actor driving the animation in your scene, you can now record data into Motionbuilder following these steps:

1. Make sure the Recording checkbox is checked in the General Controls section.
2. In the Transport Controls View, click the record button
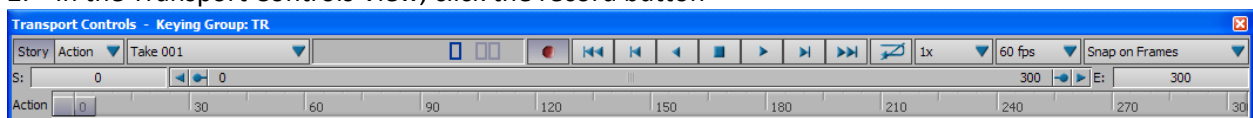
3. A message box will pop up asking whether you would like to create a new take or overwrite the current one. Choose the appropriate selection for your needs.
4. When you are ready to start the actual record, hit the 'play' button.
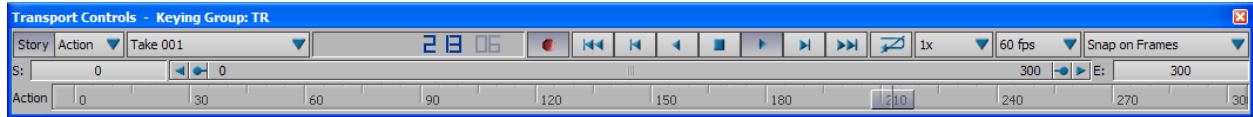
5. When you have completed your take, hit 'stop.'

To review your recording, make sure the 'Live' button is unchecked, or that your OM Device is offline. This allows the model binding to receive its motion data from the keyframes you have just recorded, as opposed to the live data from the server.

4.4 Controlling multiple Stage™ systems

If you have multiple Stage systems at your disposal, it is possible to import animation data from both of these systems to allow two characters to interact in the same scene. Simply drag in another OM Device instance into your scene, and follow the same process as explained in section 5.1. Each OM Device instance will control its system completely independently.

4.5 Recording To Multiple Characters in the Same Scene

It is also possible to 'overdub' multiple characters into the scene using a single OM Device controlling a single Stage system. That is, you can record data to one character, and then after this, record to a separate character, to provide a non-realtime interaction. Doing so only requires that you create a separate model binding for your second character.

Characterize this model binding as explained above in section 5.1. To switch between recording to either model binding, simply choose the desired model binding from the Model Binding drop-down. As usual, make sure that the Recording checkbox is checked. Each model binding will record to its own set of keyframes, so they behave independently. This makes it easy to re-record one character's movements on a given take.

5 Legal Notice

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